Atmospheric Chemistry and Physics Discussions

Atmos. Chem. Phys. Discuss., referee comment RC1
https://doi.org/10.5194/acp-2021-213-RC1, 2021

Comment on acp-2021-213

Anonymous Referee #1

Referee comment on "Measurement report: Cloud condensation nuclei activity and its variation with organic oxidation level and volatility observed during an aerosol life cycle intensive operational period (ALC-IOP)" by Fan Mei et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-213-RC1, 2021

This manuscript by Mei et al. studied the CCN activity and its variation with organic oxidation level (O:C ratio) and volatility at a rural site on Long Island, New York. It showed that aerosols originated from the Pennsylvania and New York areas contained more CCN active particles than other air mass. The hygroscopicity of organics (kappa_org) and O:C ratio first increase and then decrease with the thermal denuder (TD) temperature because of the evaporation of gas species with different chemical compositions. Overall, the manuscript is well written, and it offers new perspectives on CCN activity and the influencing parameters. I recommend the publication of the manuscript after minor revisions.

- Line 28: It seems that the last sentence of the abstract is disconnected from the context. Also, it is necessary to briefly discuss the reasons for the decrease of O:C and kappa_org here.
- Line 110: The information for the SMPS is also discussed in Line 130. This sentence can be removed. Note that the format for the reference in Line 130 needs to be corrected.
- Fig. 1: Please note that the format of the y-axes in this figure needs to be corrected. Also, the fonts for the axis labels are too small. Fig. 5 has the same issues.
- Line 164: Please check whether it is 0.50% or 0.48% as indicated in the methods section. There are a few other places in the manuscript using 0.50%.
- Line 171: Should this be 0.48% instead of 0.12%? Also, for the following sentence, why would the result show a strong size dependency? Would chemical composition play a role as well?
- Line 174: Should “only for the larger accumulation mode aerosol particles” be removed?
- Line 209: How many periods are there for each of the four air mass clusters?
- Fig. 2: It shows in Fig. 3 that LV-OOA and SV-OOA are the major factors in the organic aerosols, but why are the ALC-IOP data points outside the range of LV-OOA and SV-OOA in terms of O:C atomic ratio? It may be more informative to show all the 35 data points for ALC-IOP in this figure. The label “SV-OOA” may need to be moved to a lower location in this figure.

- Fig. 4: What are the air mass sources for the events in this figure? In the figure caption, please change “black circle” to “black dot” for consistency.
- Line 333: Above ~ 50 Celsius, the evaporated organics should be more oxygenated (not less oxygenated), which would lead to a lower O:C ratio.